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Appendix 7. Attachment: "Map of Afghanistan Showing 1968 Streamgaging Network". Scale 1:2,000,000

14. ABSTRACT

The purpose of this report is to summarize briefly the history of the Surface Water Research project since its inception in 1952, the work accomplished, and the problems encountered. In general, each topic is discussed under two periods of time: 1952-1963, when projects were confined to the Helmand River Valley and was entitled "Helmand Surface Water Investigations (306-12-021, 306-M-12-AD and 306-AC-12-AD5)," and 1963-1969 when activities were expanded to cover most of Afghanistan and title was changed to "Surface Water Research (306-11-190-002)".

Prepared by the United States Geological Survey in cooperation with the Water and Soil Survey Department, Ministry of Agriculture and Irrigation, Royal Government of Afghanistan under the auspices of the United States Agency for International Development.

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Afghanistan. Drainage. Flood control. Helmand River Project. HVA. Helmand Valley Authority. Hydrology. Hydropower. Irrigation. Lashkar Gah. Rainfall Runoff Calculations. Stream-flow Data. Stream gaging stations. Stream measurements. Surface Water. Water supply.

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Appendix (7)

Activities of the Senior Field Engineer

Surface-Water Research Project, Afghanistan

1964-68

by

Vito J. Latkovich

U. S. Geological Survey

Prepared in cooperation with the Royal Government of Afghanistan under the auspices of the U. S. Agency for International Development

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Abstract

The author served as senior field engineer in investigations of surface-waters of Afghanistan from July 1964 to September 1968 and assisted in the evolution of two phases of the program: During 1964-66 in field collection of surface-water data, office compilation and analysis of the data, and training of Afghan counterparts; during 1966-68 in field supervision of construction of 63 new gaging stations and rehabilitation or reestablishment of 16 additional gaging stations. Under the author's supervision, 74 stilling wells and 54 cableways were completed.

Introduction

History.--Surface-water resources investigations in Afghanistan have been conducted with the guidance of American engineers since 1946 when feasibility studies were undertaken by Morrison-Knudsen-Afghanistan Company (MKA) and its affiliates in the Helmand Valley development. Since 1952 the U. S. Geological Survey (USGS) has provided advisors in surface-water investigations to the Royal Government of Afghanistan (RGA) under the auspices of the U. S. Agency for International Development (USAID) and its predecessor agencies. During the period covered by this report four hydrologists of the USGS advisory team served under USAID and advised the Water and Soil Survey Department (WSSD) of the Ministry of Agriculture and Irrigation (MAI), Royal Government of Afghanistan. The USGS team included Messrs. Arthur O. Westfall, supervisory hydraulic engineer and chief-of-party; Vito J. Latkovich, hydraulic engineer, and Vincent Piro and Dallas Childers, engineering technicians, hydraulic. In July 1964, the author assumed duties as a technical advisor to the WSSD with headquarters in Lashkar Gah (Lash) until 1965, in Kandahar until 1966, and in Kabul until 1968.

In July 1964 the Lash office had a staff of six: One U. S. college-trained Afghan engineer as Director; four high-school graduate technicians; and one technician with about 20 years of experience in surface-water investigations. The other five men had experience levels ranging from 1 to 9 years. The office was functioning fairly well, having been under USGS advisory assistance since 1952. When the office moved to Kandahar in 1965 the staff remained basically the same; one technician resigned but a new one was hired.

Purpose and Authority.--The purpose of this report is two-fold: to evaluate the project period, July 1964 to July 1966; and to summarize the results of the expanded-program period, September 1966 to September 1968.

The Program-Agreement (ProAg) between RGA and USAID stated that the objective of the project was to advise the RGA, through the MAI, on procedures and practices in surface-water investigations, and to provide assistance in development of an expanded nationwide network of streamgaging stations.

Acknowledgments.--The author gratefully acknowledges the cooperation from individuals in the RGA including His Excellency Mir Mohammad Akbar Reza, Minister of Agriculture and Irrigation; Engr. Jumah Mohamedi, President, WSSD, Mr. Azizi, formerly Director General, Surface-Water Hydrology of WSSD; Mr. Abdul Khaliq, Director, Surface-Water Hydrology of WSSD, Kandahar; and other members of the department who have assisted in all phases of the project.

Surface-Water Advisory Groups.--During the reporting period surface-water investigations in Afghanistan were carried on by three technical aid missions: USAID; Federal Republic of Germany Hydrological Mission (WGHM); and a technical mission of the Union of Soviet Socialist Republics (USSR). USAID activities, through a participating agency service agreement with the USGS, are directed nationwide with the exception of the Kabul, Kunduz and Amu Darya (Oxus River) drainage basins.

The WGHM was active in hydrologic investigations of the Kabul and Kunduz River basins until December 1968 and is presently (1969) making investigations in the Kaitu and Khoram River basins. Construction on the latter two rivers was a joint undertaking by the WSSD, USAID and WGHM. Cableways were constructed by USAID and stilling wells by WGHM with WSSD assistance on both.

Hydrologic investigations of the Amu Darya and Amu Panj River basins are being carried on by the USSR technical mission.

Project Activities 1964 to 1966

General.--The Lash WSSD office has been a working unit since it was established in 1952. When the author assumed advisory duties in the office in 1964, it was staffed with one U.S.-educated Afghan engineer and five technicians, four of whom were high-school graduates. The Afghan engineer served as Director and the most experienced technician served as Assistant Director because of his many years in surface-water investigations and as a counterpart to former USGS advisors.

Field and Office Work.--During the first year of the author's assignment in Afghanistan, the Lash office was responsible for operating 15 gaging stations in the Helmand River Basin, which comprises roughly 35,000 square miles. Four vehicles were used, of which two were usually not fieldworthy or were unreliable for long desert trips. Because of the extensive paper work and financial complications, gasoline vouchers and vehicle parts took days and sometimes weeks to arrive from the Kabul office. Operational and payroll funds were usually sent quarterly; many times payroll funds arrived one or more months late. One field crew serviced the 4 western stations and the other crew the remaining 11 stations. The field trips would average 8 or 9 days, barring vehicle and equipment breakdowns which were very frequent. The author travelled extensively (about 45,000 miles during 1964-1966) in advising, assisting, and training personnel.

Office work from 1964 to 1965 was relatively limited due to the need for extensive training of field and office personnel. The author computed the bulk of the streamflow records for 1963 and 1964 while training personnel in office computations. Office working conditions during this period were not wholly adequate.

In September 1965, operations of the Lash office were moved to Kandahar. At the same time the Director was transferred to the Kabul office and the Assistant Director was made Director. Because of the new Director's years of experience and fine knowledge of surface-water methods and procedures, field and office work ran more efficiently and effectively. The author still travelled but not as extensively and the Director made all minor decisions such as assigning field trips, readying equipment and vehicles, and supervised record computations. Field trips were shortened and completed on schedule. The technicians, equipment, and vehicles were brought up to a state of preparation for all hydrologic events and especially prior to the high-water period. This resulted in excellent coverage during the 1965 high-water period which later proved invaluable in verifying and establishing ratings for the stations in the Helmand Basin. The office work continued on excellent standards. The USGS chief-of-party then ruled that the office was self-sustaining and that the author's assistance was no longer needed on a full-time basis. When the author left on home leave in mid-1966, he left with a genuine feeling of satisfaction and accomplishment.

Goals Attained.--The author had worked at and seemingly attained most of the goals that had been established for the program in the Helmand Basin:

1. Scheduling and implementing field trips was worked out on an efficient and effective basis; i.e., trips were shortened to what was feasible and necessary; technicians were moved around from area to area to develop an overall picture of stream-flow conditions; datum checks at stations were done annually and on schedule.

2. Vehicles were better maintained and always kept on the "ready line"; mechanics were kept more on the job and repairs were made with relatively little involved. Proper completion of standard maintenance were checked as closely as possible. Also, just the fact that the author checked over the vehicle before a trip kept the drivers and mechanics as well as the responsible technicians aware that the author would be greatly "perturbed," if that vehicle broke down on a trip because of laxity in preventative maintenance.

3. Field to office communications were improved and technicians realized that it was important to telephone information to headquarters about unusual situations at stations that if not appraised or investigated, would result in the loss of valuable data.

4. High-water periods and other hydrologic events were prepared for in advance, and technicians, equipment, and vehicles as well as the station observers were alerted and ready to react in the most effective and efficient manner. Stations needing attention were identified and field crews dispatched to effect repairs. Many excellent high-water and flood measurements were obtained in 1965 because the Kandahar office was in a state of readiness and the technicians knew their assignments and did what was expected of them.

5. Gaging equipment was serviced, maintained, and kept in good working condition insofar as possible. Technicians were taught to clean, inspect, and repair equipment as soon as a trip was completed and to return the equipment to the storeroom in good condition. Storerooms were periodically inventoried and cleaned, and all materials and vehicle parts were properly arranged for easy access. This resulted in finding materials and parts that had been received as much as 10 years previously and had been recently re-ordered, because no one was aware that they were on hand. All repairable equipment was put in service and made available to the project.

6. Office methods and procedures were updated and the "Hydrology Training Manual No. 1" (Westfall, 1964) was put into use as the standard field reference. Office standards and procedures contained in a manual and compiled over the years by the USGS advisors were completely rewritten, updated and expanded by the author. Records were computed on a continuing basis and the author tried to see that the records were computed monthly and the station file updated annually. Office files were cleaned, indexed, and updated according to years and areas. Training lessons as well as individual attention were given to technicians in areas of needed improvement.

If counterpart logistic support had not been so limited, the Kandahar office would have continued as the most highly effective and efficient functioning unit of the WSSD. However, when the author left for home leave in 1966 and was not there to see that certain items of support were obtained from headquarters in Kabul, the working effectiveness of the office dropped off considerably.

Project Activities 1966 to 1968

Proposals.--The most important proposal made in the expanded program was to construct a nationwide network of 85 streamflow gaging stations and 8 meteorological stations to cover all basins except those of the Amu Darya and Kunduz Rivers. One station, constructed on the Kabul River, was at Tangi Garu. The Kabul River station would be used as a demonstration and training station for WSSD personnel and Kabul University engineering students and would be instrumented with American and German streamflow and meteorological recording equipment.

Reconnaissance.--In the spring of 1966 the author began field reconnaissance to locate new sites for streamgaging and meteorological stations in the southern, eastern, western,and northwestern parts of the country. A. O. Westfall, chief-of-party of the USGS team, covered some areas in the north and northeast. Many of these sites however, were in the Kabul and Kunduz River basins and were ultimately not included in the program. About 40 sites were selected, investigated, and described by the author between May and July 1966. Reconnaissance studies of the remaining sites were made following home leave and during the construction phase of the expanded program.

Construction.--Mr. Westfall initiated station construction in September 1966 with crews working on the Kabul River station and at three sites in the Hazarajat (central plateau of Afghanistan). The author returned from home leave September 28, 1966, and assumed supervision of the bulk of field activities. The total available personnel were 10 Afghan technicians (inexperienced) from the WSSD and 5 Peace Corps Volunteers, who were experienced and were assigned the jobs of construction supervisors for quality control. USAID project vehicles and drivers were provided each crew which included one PCV, one or two WSSD technicians, and where possible, one soldier-laborer from the MAI. Additional laborers were hired on the work sites.

The author guided crews to the pre-selected sites, pointed out the proposed locations for stilling wells and cableways, and detailed the work methods; questions that arose were answered on the spot. Initial plans called for setting the wells and pouring the main anchor blocks for the cableways. While the crews were digging, the author made sure that the stilling-well materials, reinforcing bars, and cement were delivered to the sites. Usually one crew worked at three to four sites in the same general area. USAID and WSSD provided large trucks adequate for materials transport. Construction materials provided by USAID included corrugated-metal pipe for the stilling wells, spiral-weld bridge piling for the cableway column supports, and welding rod; the WSSD provided reinforcing bars, cement, wire, lumber, and small hardware items. Most construction equipment and tools were supplied by USAID; WSSD supplied digging tools and de-watering pumps.

Prefabrication of cable cars and instrument shelters was done at the Afghan Institute of Technology (AIT) in Kabul. The fabrication crew included one PCV (supervisor), one or two WSSD technicians, two carpenters, a machinist, and a welder. The USGS team planned or designed and the author drafted standard plans for cable cars, shelters, shackles, anchor blocks, column supports, and various special structures. The AIT shop crew were responsible for fabricating 75 recorder shelters (55-gallon drums were used) and 59 cable cars (similar to the USGS standard wooden sit-down car). The author supervised the fabrication of the cableway column supports at the USAID Kandahar shop and at times was assisted by one WSSD technician. All column supports (64), landing hooks for cable cars (70), and special structures were hand made. The telescoping column supports (27, 30, and 45 feet) that were used on the 650-foot Mala Khan and 755-foot Khaubgah cableways took almost 8 days to complete.

Field crews worked rapidly and were shifted to new sites as soon as work was finished at completed sites. The most serious problem was slowness of logistic support on the part of the WSSD with respect to vehicles and transportation of materials. This was mostly due to a heavy administrative work load, funding problems, shortage of materials, manpower turnover and shortage, and equipment breakdowns. Planning by the USGS team was always one month ahead on station schedules, materials requests, and work assignments. Much time was spent by the team in locating and procuring materials, checking out work details and manpower, making minor and often unnecessary decisions, and constantly urging and pushing the field programs. Too much reliance was placed on the USGS team for decisions or actions that could very easily have been handled by the Kabul WSSD office. After crews were placed at work sites, reconnaissance was made of the next site area. The crews were never waiting for a new work site. From November 1966 to February 1967 the author travelled about 17,000 miles in connection with this work. As the work progressed, crews returned to the sites to pour concrete for the support footings and sideguy anchor blocks. The author had plotted the cross sections and selected the block sites previously. In March 1967, two additional USGS field engineers, Vincent Piro and Dallas Childers, arrived to work on the construction program under the direct supervision of the author.

In January 1968, cableway erection began and the author installed Stevens A-35 water-level recorders at the stations that were complete and where observers had been hired. From March to June 1968, crews were sent out to make high-water measurements. Construction resumed in late June and was still in progress when the author left Afghanistan on September 28, 1968. Seven stations, originally recommended, will not be constructed during the present program, as the WSSD postponed construction until future years.

High Water Activities.--The author planned and directed the field activities for the 1968 high water period (March to June). At 35 gaging stations observations were made by 10 crews. For logistic convenience each crew serviced the stations within a certain area of the country. USAID provided five of the project vehicles and drivers; WSSD provided the rest. All available WSSD technicans were used along with the five PCV. The two USGS field engineers checked continually on the crews. The author made inspection and evaluation trips from time to time but his main effort was on construction during the period. The USGS field engineers readied the equipment, vehicles, and technicians. Usually, field crews were moved to another area at the end of each month. Again WSSD logistic support could have been better. All the effort and time involved in preparation was very effective resulting in excellent coverage during the high water period. Many measurements were made at new stations and will be extremely valuable in rating these stations for 1968 and in the future. The USGS team is proud of all the WSSD and PCV men that contributed to the success of the high water activities in 1968.

Summary

Effective June 1969 (USGS phase out), the WSSD will have 66 additional stations. As of December 1968, when the WGHM phases out of the streamgaging program, the WSSD will have 129 streamgaging stations. Also, if the WSSD completes the 7 future stations, the grand total will be 136 stations in a nationwide network. Assuming an average of 4 stations per technician, the WSSD will need a staff of at least 35 to 40 field men to maintain these stations as well as a headquarters staff of about 10 to 15. The WSSD, in the future years, will have to assume a large responsibility if all 136 stations are to be serviced at least once monthly.

Following is a summary of gaging station construction as of September 1968:

New	
Stilling wells (58 completed)	63
Cableways (44 completed)	49
Rehabilitated (all completed)	
Stilling wells	13
Cableways	8
Re-established (all completed)	
Stilling wells	3
Cableways	2
Total constructed	
Stilling wells	79
Cableways	59

Following is a summary of major construction materials used as of September 1968:

	Diameter (inches)	Length (feet)
Wire rope	1	1,300
	7/8	13,500
	3/4	500
	1/2	7,500
Cableway support pipe	10 3/4	960
	12 3/4	60
CM culvert pipe	24	1,100
	60	21

Status of streamgaging station construction as of September 1968

	Station Number	Station name	Category	Stilling well	Cableway
1.	1100.90	Wakhan River near Wakhan	F	+	+
2.	1200.50	Kokcha River near Ughan	F	+	+
3.	1200.60	Kokcha River near Barak	N	x	x
4.	1200.80	Kokcha River near Mashad	N	x	+
5.	1250.20	Warduch River near Zebok	F	+	+
6.	1250.70	Warduch River at Barak	N	x	x
7.	1250.80	Warduch River near Barak	N	x	x
8.	1280.90	Mashad River near Mashad	N	x	x
9.	1400.70	Kholem River near Tashkurgan	RH	x	USSR-built
10.	1400.80	Kholem River at Tashkurgan	N	x	x
11.	1500.20	Balkh River near Niak	N	x	x
12.	1500.70	Balkh River at Chismasafa	RH	x	USSR-built
13.	1550.90	Darra Suf River near Aq Kupruk	N	x	x
14.	1600.50	Sari-i-Pul River near Sar-i-Pul	RH	x	USSR-built

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
15.	1620.90	Sorab River near Sar-i-Pul	N	x	x
16.	1700.20	Shirin Tagao River near Maimana	N	x	x
17.	1700.60	Shirin Tagao River at Daulatabad	N	x	x
18.	1700.70	Shirin Tagao River near Daulatabad	RH	x	USSR-built
19.	1760.20	Qaisar River at Qaisar	N	x	Not Needed
20.	2000.80	Murghab River at Murghab	N	x	x
21.	2100.90	Boom River at Boomdarra	N	x	x
22.	2500.80	Chichaktu River at Chichaktu	N	x	x
23.	2700.90	Sharah River at Babulai	N	x	+
24.	2800.90	Kuskh River at Torghondi	F	+	+
25.	3000.10	Hari River at Daulat Yar	N	x	x
26.	3000.60	Hari River at Marwa	N	x	x
27.	3000.90	Hari River at Tirpul	N	x	Not Needed
28.	3600.80	Karookh River near Herat	N	x	Not Needed

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
29.	3700.50	Sinjou River at Khuskh Rabat	N	x	Not Needed
30.	4000.80	Adraskand River near Jija	N	x	Not Needed
31.	4600.90	Anardarra River at Anardarra	N	x	Not Needed
32.	5000.30	Farah River at Petchi Tangi	RH	x	x
33.	5500.90	Malman River near Shawalat	RH	USSR-built	x
34.	6000.80	Khash River near Lukhi	N	x	x
35.	7000.05	Helmand River near GardendiWal	N	x	x
36.	7000.10	Helmand River near Ghizao	RH	x	x
37.	7000.30	Helmand River below Kajakai Dam	RH	x	x
38.	7000.40	Helmand River at Lashkar Gah	RE	x	x
39.	7000.60	Helmand River at Mala Khan	N	x	x
40.	7000.80	Helmand River at Khaubgah	N	x	x
41.	7000.90	Helmand River at Shela Charkh	RH	x	+
42.	7100.90	Syasang River near GardendiWal	N	x	x

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
43.	7200.90	Markhana River near Panjao	N	x	x
44.	7300.90	Panjao River near Panjao	N	x	x
45.	7400.90	Kaj River near Kajroon	N	x	x
46.	7500.20	Tirin River at Oruzgan	N	x	x
47.	7500.30	Tirin River near Tirin	N	x	x
48.	7500.80	Tirin River at Anar Joi	N	x	x
49.	7600.90	Musa Qala River near Musa Qala	RH	x	Not Needed
50.	7700.90	Sangin Wash at Sangin	N	x	Not Needed
51.	7800.20	Arghandab River near Sang-i-Masha	N	x	x
52.	7800.30	Arghandab River at Maisan	N	x	x
53.	7800.50	Arghandab River above Arghandab Reservoir	RH	x	x
54.	7800.60	Arghandab River below Arghandab Dam	RH	x	x
55.	7800.70	Arghandab River near Kandahar	N	x	Not Needed
56.	7800.90	Arghandab River at Qala Bist	RH	x	x

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
57.	7820.90	Shah Joi Wash at Arghandab Reservoir	N	x	x
58.	7880.20	Dori River near Spin Baldak	N	x	x
59.	7887.30	Arghestan(Lora) River near Shinkai	N	x	x
60.	7888.10	Tarnak River near Sha Joi	N	+	+
61.	7888.20	Tarnak River near Kalat	N	x	x
62.	7888.90	Tarnak River near Kandahar	N	x	x
63.	7889.90	Kuskh-i-Nakhud River at Kuskh-i-Nakhud	N	x	Not Needed
64.	8000.50	Kabul River at Tangi Garu	N	x	x
65.	8200.40	Qargha River above Qargha Reservoir	N	+	Not Needed
66.	8210.90	First Unnamed Tributary above Qargha Reservoir	N	+	Not Needed
67.	8220.90	Second Unnamed Tributary above Qargha Reservoir	N	+	+ Not Needed
68.	9300.20	Khoram River near Ahmed Khel	N	x	+
69.	9300.30	Khoram River at Mushaki	N	x	x

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
70.	9300.90	Khoram River near Chakmani	N	WGHM-built	x
71.	9350.90	Gabr River near Chakmani	N	x	x
72.	9400.30	Kaitu River at Domandi	N	WGHM-built	x
73.	9420.90	Tongi River at Domandi	N	WGHM-built	x
74.	9430.90	Matun River near Khost	N	WGHM-built	x
75.	9500.90	Gumal River near Marana	F	+	+
76.	9600.80	Mastoi River near Urgun	F	+	+
77.	9700.80	Margha River near Urgun	F	+	+
78.	10000.10	Ghazni River below Seraj Dam	RE	x	x
79.	10000.20	Ghazni River at Ghazni	N	x	Not Needed
80.	10000.80	Ghazni River at Shinia	N	x	x
81.	10300.20	Jilga River at Gardez	N	x	x
82.	10300.70	Sardi Canal below Sardi Dam	N	+	+
83.	10300.80	Jilga River below Sardi Dam	N	x	x

See footnotes at end of table, page 23

Status of streamgaging station construction as of September 1968--Continued

	Station Number	Station name	Category	Stilling well	Cableway
84.	10390.90	Paltu River above Sardi Reservoir	RE	x	x
85.	11000.10	Park River near Yusuf Khel	N	x	x
86.	11000.80	Park River near Zarghun Shar	N	x	Not Needed

N - New

RE - Former station reestablished at same site.

RH - Major rehabilitation of existing station

X - Complete

\+ - Incomplete

F - Recommended for future construction. Field reconnaissance surveys have been made at some sites.

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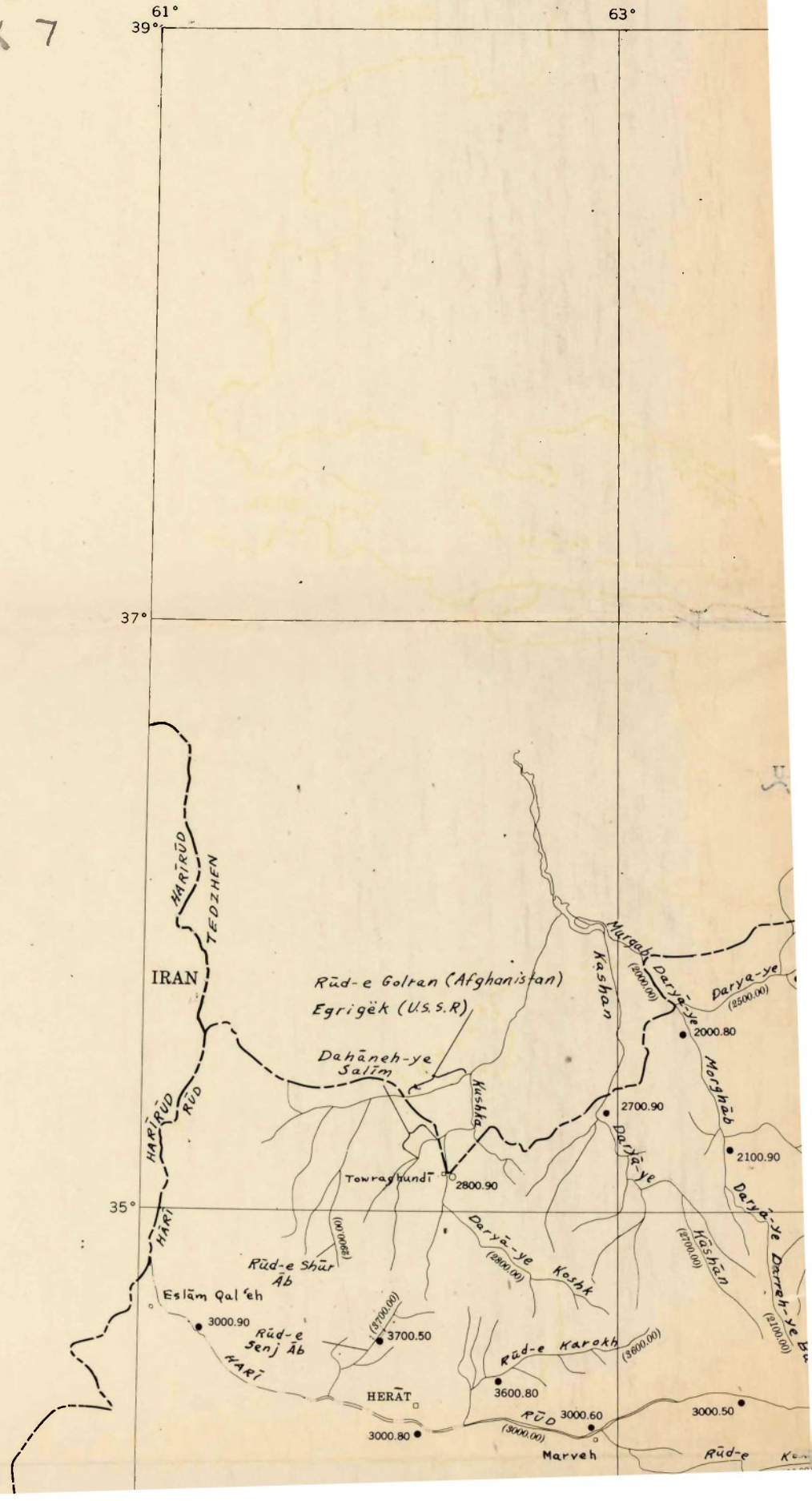

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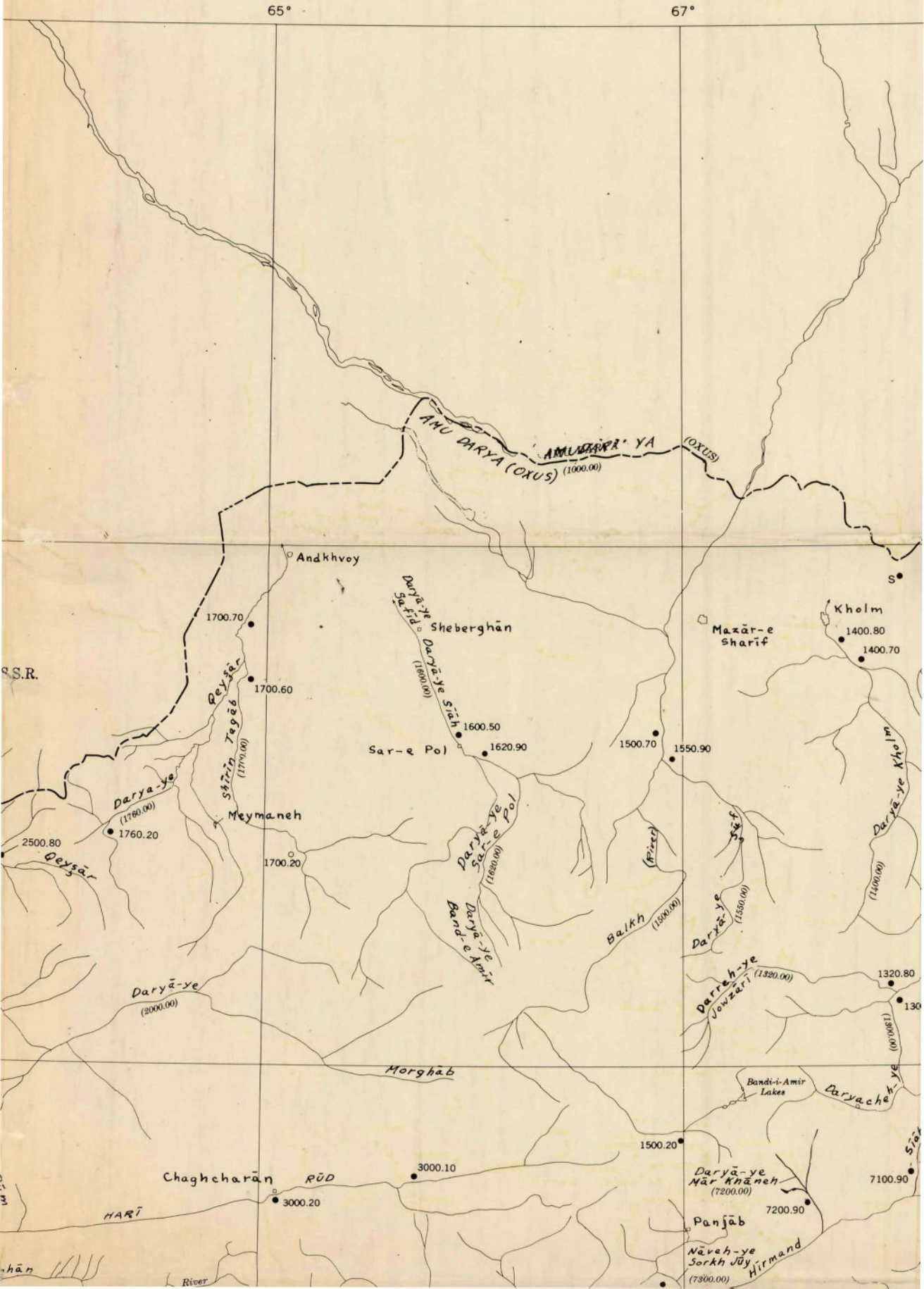
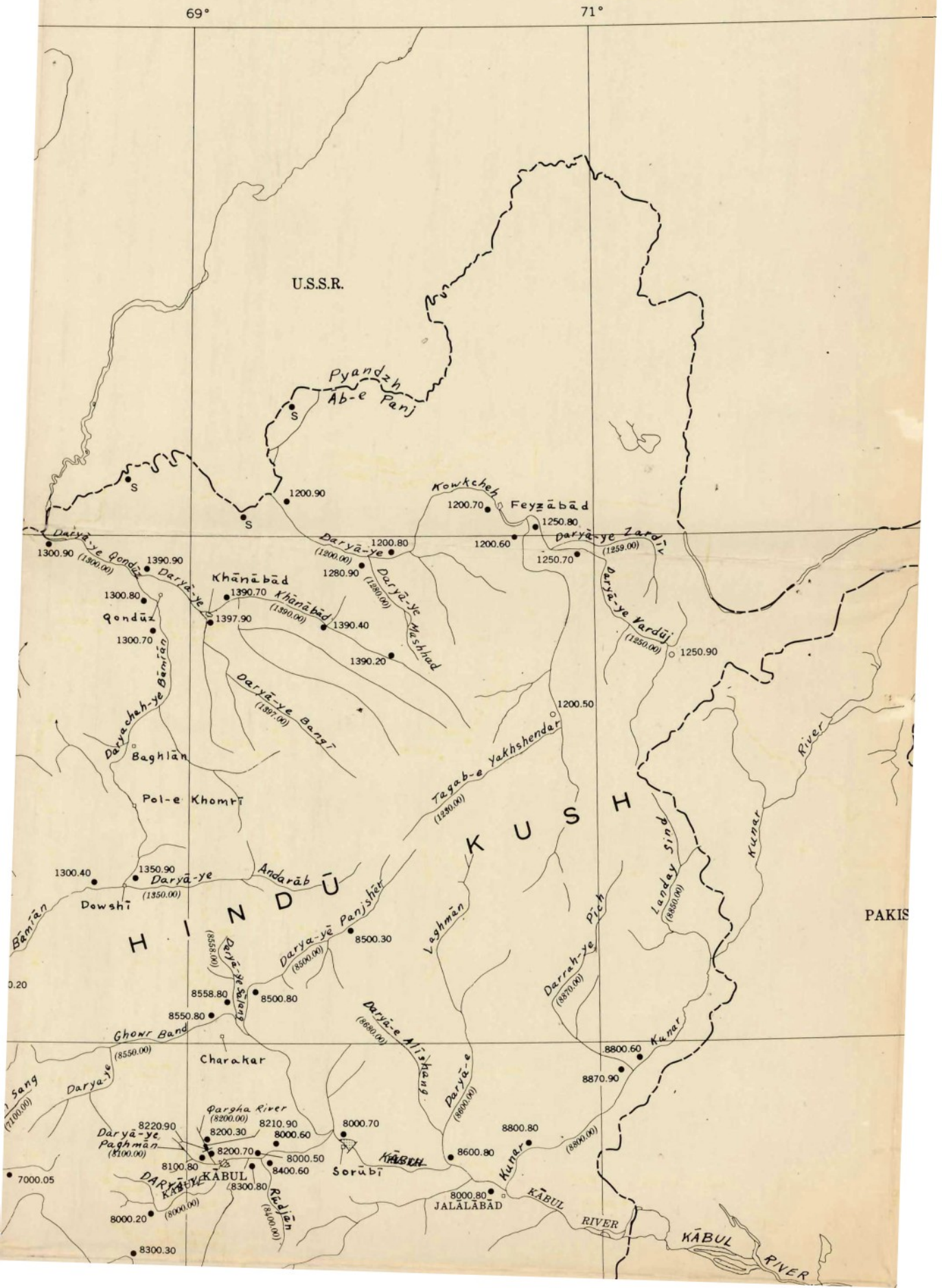


SOIL SURVEY DEPARTMENT, MINISTRY OF AGRICULTURE AND IRRIGATION,
STATES AGENCY FOR INTERNATIONAL DEVELOPMENT




75°
39°
73°
CHINA
Pamir
Darya-ye
Pāmīr
CHINA
Sarḥadd Vākhān
37°
1100.90
Āb-e
(1100.00)
JAMMU
AND
KASHMĪR
35°
STAN

Base from World Aeronautical Chart, Scale 1:1 000 000, 1959


Shahrak
3500.20
Rūd
Yarkhān
7300.90
DASHT-E NĀVAR
7000.10
Gīzāb
Daryā-ye (7000.00)
Sang-e Masheh
7800.20
Rūd-e (7400.00)
7500.20
Orozgān
Chora River (7540.00)
Rūd-e Terī (7500.00)
Mūsá Qal'eh Rud (7600.00)
Arghandāb
Moqor
Daryā-ye
7000.20
7500.80
7500.90
7500.30
Tirin
7888.10
Bank-e Kajakī
Bolayk Rūd
V A L L E Y
Wayan Wash
7000.30
7800.30
7600.90
Sangīn Mandeh (7700.00)
Daryā-ye (7800.00)
7800.50
Qalāt
7888.20
Rowd-e Lūrah
7700.90
Almīsh Mandeh (7820.00)
7820.90
Tarnak Rūd (7888.00)
Band-e Arghandāb
Boghrā
Gereshk
Rūd-e Koshk-e Nakhvod (7889.00)
7800.60
Chehel Gazī
7889.90
7800.70
Qandahār
7888.90
7887.30
7000.40
Qal'eh-ye Best
7800.90
Arghastān (7887.00)
7887.90
Dūrēy Rowd (7880.00)
7880.20
Kadaney Rūd
PAKISTAN
Lora
Pishīn
QUETTA
65°
67°

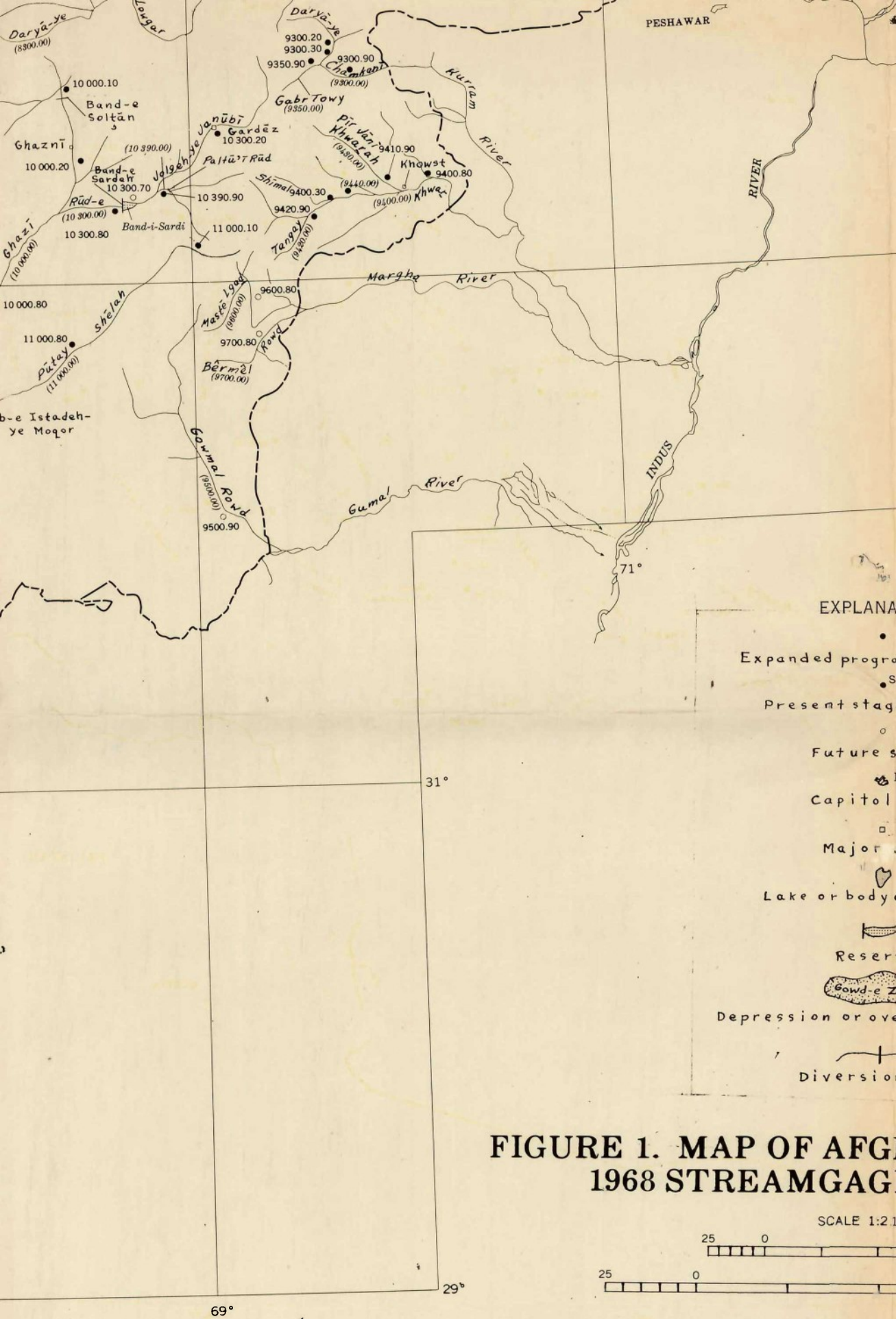


FIGURE 1. MAP OF AFG
1968 STREAMGAG

TION

m station

estation

tation

KĀBUL

city

Sheberghān

ity

Dak (lake)

of water

Band-e Arghandāb

voir

ereh

erflow basin

n dam

HANISTAN SHOWING
ING NETWORK.

00 000

125 KILOMETERS

125 MILES